U.S. ARMY-BAYLOR UNIVERSITY

A COST ANALYSIS OF EMERGENCY MEDICAL SERVICES AT WILLIAM BEAUMONT ARMY MEDICAL CENTER

A GRADUATE MANAGEMENT PROJECT

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BY

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ABSTRACT

The purpose of this graduate management project was to prepare an estimate of the full cost of providing inpatient care for emergency department admissions for the military and civilian community of El Paso, Texas for fiscal year 1995. It was found to be an efficient, reliable methodology which can be applied to any military treatment facility. By understanding how costs are accumulated within the MTF, management may make more informed decisions as to the provision of health services. This methodology combines a product line costing approach with the current step down process of MEPRS. The end result places a price tag on the product line in question.

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INTRODUCTION

The exponential growth in health care expenditures over the past two decades has continued annually to consume greater amounts of the gross domestic product (GDP). In 1970, healthcare expenditures accounted for approximately seven percent of the GDP and by 1994, those expenditures have nearly doubled to fourteen percent (Healthcare Executive 1996). It is estimated that by the year 2065 healthcare will account for approximately thirty-three to fifty percent of the GDP (Warshawsky 1994). This rise in healthcare expenditures has pushed cost-containment and even cost reductions to the forefront of the healthcare delivery systems' agenda.

Military, as well as civilian healthcare systems, are feeling the impact of cost containment strategies. While civilian organizations have seen an evolution in reimbursement mechanisms used by Medicare and Medicaid, the Department of Defense (DoD) and Department of the Army (DA) have also been active in changing funding mechanism. The DA's shift from workload reimbursement to capitation and to its current system of TRICARE lends itself to accurate cost accounting systems. The Army Medical Department (AMEDD) medical treatment facilities

(MTFs) must have accurate cost information to make informed decisions.

It is equally important that MTFs understand associated revenue streams. In addition to funding allocated by the Office of the Assistant Secretary of Defense (Health Affairs) (OASD(HA)), new revenue streams are appearing. Recent negotiations in Lead Agent Region VI have yielded partial reimbursement for trauma services provided by Brooke Army Medical Center and Wilford Hall Medical Center in San Antonio, Texas (Yoshihashi 1996). Additionally, a simulated demonstration project between OASD(HA), DoD, and the Department of Health and Human Services (DHHS) will allow Medicare to treat the Military Health Services System (MHSS) similar to a risk-type health maintenance organization (HMO) (Memorandum of Agreement 1996). This demonstration project will make it possible for Medicare payments to MTFs to offset the cost of care associated with some Medicare eligible beneficiaries who are treated in military facilities. Most recently DHHS and the Health Care Financing Administration (HCFA) are initiating mechanisms for Medicaid reimbursements (Vega 1996).

CONDITIONS WHICH PROMPTED THE STUDY

The historical changes, as outlined above, have had considerable impact on William Beaumont Army Medical Center (WBAMC), El Paso, Texas. Trend analysis has revealed declining

inpatient census and reduced lengths of stay (LOS) at WBAMC in recent years (Williams 1996). Corresponding budget decrements and possible elimination of the current graduate medical education programs necessitate the need for WBAMC to have a more precise financial picture. Additionally, recent discussions concerning the sale of Thomason General Hospital, a county owned entity and the only other trauma-capable hospital in the local area, to a for-profit organization, raise the possibility of increased emergency medical services workload at WBAMC. Therefore, it is in the interest of survivability that WBAMC conduct cost analysis on traditionally expensive services such as those provided through the portal of the emergency department.

STATEMENT OF THE PROBLEM

What is the average full cost per patient, per beneficiary category[1], of the healthcare services provided to those who enter WBAMC through the Emergency Room Department?

REVIEW OF THE LITERATURE

Although this analysis is an economic tool to be used by the WBAMC executive staff, it is important that the non-financial impacts of this study are understood. There are ethical and

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[1]Beneficiary categories: Active duty, Active Duty Dependent, Non-Active Duty, Non-Active Duty Dependent, MEDICARE eligible, MEDICAID, Veteran's beneficiaries, and others. To be discussed in the Methodology section.

legal issues that surround the matter.

LEGAL AND ETHICAL ISSUES

Currently, there are no trauma centers, as defined by the American College of Surgeons (ACS), in the local and surrounding areas of El Paso (Schreiber 1996). However, WBAMC and Thomason operate as trauma centers without certification by the ACS. WBAMC's trauma capabilities are within the ACS guidelines for a level II treatment facility and could easily be upgraded to a level I trauma center (Schreiber 1996). Accompanying these notable designations are federal mandates concerning the accessibility of emergency room services. The Omnibus Reconciliation Act of 1985 gave uncontested access of patients to emergency care services (Koehler, 1992). Hospitals that are equipped to treat people who present at their emergency room are required to provide emergency care within the facility's and staff's capability regardless of the patient's ability to pay for services rendered. Additionally, a disproportionate percentage of trauma patients are uninsured, and of those that are covered by programs such as Medicare and Medicaid, the actual costs of the health services provided are not fully covered. In 1990, Mount Saini spent approximately $12,000 per trauma case and was only reimbursed around $4,200 per Medicaid beneficiary (Skolnick 1992).

There is an ethical problem if support is not provided

to those within the community where trauma and emergency medical services are necessary. It is estimated that effective regional trauma systems have reduced preventable death rates by fifty percent (Koehler 1992). It is therefore important to understand the effects on the community if a trauma service were to close in any community.

COST ACCOUNTING REVIEW

Cost accounting is an element of financial management that generates information about the costs of an organization and its components (Finkler 1994). The advent of the prospective payment system necessitated the use of more sophisticated cost accounting systems (Young and Pearlman 1993, Rezaee 1993). Increased financial pressure on hospitals and heightened competition in local markets have facilitated the use of accurate cost accounting information to aid management decision-making (Orloff et al. 1990). The cost of the healthcare services is unrelated to billed charges, such as those calculated by diagnosis related groups (DRG). Services may in fact cost more or less than the actual billed charges resulting in a profit or loss.

There are numerous accounting techniques available to managers to correctly identify healthcare service costs. Older methods of cost accounting, such as cost to charge ratio, weighted procedure surcharge, and per diem costing, are considered inaccurate and obsolete (Loop 1995, Thorely and Jones

1994). Currently, cost accounting systems are grouped into product costing, standard costing, microcosting, and a relatively new methodology termed activity based cost (ABC) accounting (Finkler 1994).

Product Costing

Most cost accounting systems stem from product or "traditional" cost accounting approaches (Finkler 1994). Traditional cost accounting is further broken into process, job order, and hybrid methodologies.

Job Order Costing

This is normally associated with custom project accounting. Each item or "job" that is produced has identifiable costs matched to that unit of production. It is a complex form of cost accounting, time consuming, and is best suited for products that vary from order to order (Eastaugh 1987).

Process Costing

This method is the most basic approach to cost accounting. It involves averaging the accumulated costs according to a specific cost center's processes and dividing cost by volume, to arrive at a unit cost per item (Eastaugh 1987). Costs may then be aggregated using cost allocation methods to determine an average cost per patient.

Hybrid Approach

Most organizations do not use pure job order or process costing. A mixture of job order and process systems exist to mesh the demands of information costs with the need for accuracy. In high cost procedures such as a computerized tomography (CT) scan, a job order system might yield the best decision-making information at an acceptable cost. However, a laboratory that conducts thousands of similar procedures might use a process costing system. In this case, the necessary cost information is considered adequate for the decision-maker and is usually less expensive to gather than a job order methodology (Eastaugh 1987, Finkler 1994).

These techniques of product costing may then be applied to determine departmental or product line costs. That is, services may be viewed as either a departmental service or a series of tasks (intermediate steps) that form a product line. For example, managers can perceive a radiology appointment as a departmental cost or as an intermediate cost of a product line associated with the treatment of a broken leg. Cooper and Surver (1988) contend that product line costing is a powerful tool in estimating and evaluating product mix to determine which services should be eliminated or what intermediate products are most costly.

Product line costing involves knowing an accurate cost for

each patient for a particular product. It accounts for the variation of the degree of complexity which an individual patient inherently maintains. This allows managers to conduct "what if" analyses under varying market conditions (Cooper and Surver 1988).

Departmental costing, on the other hand, only considers the type of patient. This is regardless of the complexity of the patient diagnosis. An ambulatory patient needing a particular procedure would cost the same as a non-ambulatory patient needing the exact same procedure. This method would not account for the possible increased work of providing the service to the non-ambulatory patient (Finkler 1994).

Yee-Ching notes a significant problem with these traditional cost accounting systems. Yee-Ching (1993) describes them as volume-based accounting systems. Consequently, low-volume products are consistently undercosted and high-volume products are consistently overcosted by such systems. This is enigmatic, as it is widely held that as volume increases efficiencies are gained through economies of scale (Yee-Ching 1993).

Standard Costing

Standard costing is an adjunct product costing methodology sometimes referred to as the Cleverly model. In 1987, William Cleverly proposed a product costing methodology based on the

accumulation of standard units (SU). Standard units are intermediate products which when totaled will yield a cost for a given procedure. Treatments are outlined through standard treatment protocols (STP) and thus give management a fairly accurate and predictable cost analysis (Cleverly 1987).

Finkler (1994) contends that while it is argued that each patient is unique and standards are not possible, reimbursement systems do group patients together for payment. It is therefore obligatory for managers to group patients together for costing as well.

Microcosting

Microcosting is the process of closely monitoring and examining the actual resources consumed by a particular patient or service (Finkler 1994). Microcosting was developed at the University of Pittsburgh to correct the inadequacies of macrocosting (Shuman and Wolfe 1992). Shuman and Wolfe (1992) developed the following five steps for microcosting from 1969-1972 shortly after the initiation of the cost based reimbursement methods used by Medicare and Medicaid:

1. All direct and indirect costs of a unit would be allocated to its revenue producing services according to a rational, consistent basis.

2. It would result in an accurate representation of the "true" cost for each service provided in the revenue center of

interest.

3. Cost analysis models must be transferable among institutions with only minor modification.

4. Models must be computerized and usable in a dynamic manner.

5. A major technological change would only require an examination of the factors affected and not the entire system.

Microcosting is an extremely time intensive process and can be cost prohibitive. Microcosting is usually implemented where specific cost data is necessary and the accuracy of the data outweighs the costs associated with the collection process. Normally, this is the case with special study programs (Finkler 1994).

Activity Based Cost (ABC) Accounting

Activity based cost (ABC) accounting has its origins in industrial entity's product lines (Baker 1995). According to James Canby (1995), ABC accounting defines costs in terms of an organization's processes or activities and determines costs associated with significant activities or events. Those activities represent the orchestration of technology, people, raw materials, and skills that go into the delivery of healthcare. ABC focuses on the cost drivers (any causal factor that increases total costs) to apply costs to cost objects (Ramsey 1994). Cost objects are the activities which are defined and subsequently

aggregated based on the cost driver to determine an activity cost (Yee-Ching 1993). The ultimate goal of this method is to more accurately distribute overhead to an associated activity. Rather than applying a pure volume based relationship, which is misleading, an actual weight is assigned to each overhead cost object and is then applied to the cumulative total. The result is an accurate picture of those services which are more costly than the revenue they generate. However, as Yee-Ching (1993) points out this information is provided at a significant cost and therefore, should initially be applied only to those more expensive services. The value of this method is readily acknowledged by the DoD. A briefing at the Resource Managers conference in San Antonio, Texas (1996) described the need to adopt an ABC approach to cost analysis within the Military Health Services System (Spicer 1996). The goal under the new Expense Assignment System IV (EAS IV) will be the transition from determining what is spent to how it is spent. It is DoD's ultimate intent to tie together or link the human resource system, financial system, logistical system, and clinical systems under the umbrella of a centralized executive information system (Spicer 1996).

Cost Accounting Mechanics

All of the above cost accounting methodologies have similarities in how costs are defined. The application of the

definitions are the nuances of the methodology. All cost accounting systems deal with various types of costs, whether direct, indirect, relevant, full, fixed, variable, or other. It is therefore important to discuss basic cost terminology.

Direct and Indirect Costs

Direct costs are those costs clearly associated with the cost objective (destination of an assigned cost). They are normally under control of the manager within the department or cost center. Indirect costs are more nebulous in their assignment. Indirect costs are also called overhead costs and as discussed above are allocated to cost centers in numerous fashions (Finkler 1994). In any organization, a cost not classified as a direct cost is, by default, an indirect cost (Needles, Anderson, and Caldwell 1984).

Fixed, Variable, Semi-Variable (Mixed), Semi-Fixed (Step-Fixed) Costs, and Full Costs

Fixed cost will not vary within a relevant range of volume or activity (Needles, Anderson, and Caldwell 1984). They remain relatively constant over time and over the amount of relevant activity. Variable costs, however, change with the provision of service to each individual patient. They will increase or decrease in direct proportion as the volume of patients fluctuates. For example, a facility's rent or mortgage cost is a stable monthly expense. It will remain the same regardless of

the number of patients seen within its walls. It is therefore a fixed cost. Supplies on the other hand would be a variable cost. As the number of patients seen increases, the volume of supplies will generally increase at a proportional rate (Finkler 1994).

The sum of fixed and variable costs is the total or full cost (McConnell 1984). The term "full cost" is a measurement, expressed in monetary units, of all resources used for a given cost objective (Broyles and Rosko 1986). Full costs, while not normally important when making program evaluation decisions, are necessary when attempting to determine the maximum justifiable price for reimbursement (Holmes 1996).

There are costs that contain characteristics of both fixed and variable costs. Mixed costs are those in which the fixed and variable components cannot be separated. A telephone bill is a realistic example. Monthly telephone charges are made up of a service charge (fixed) plus extra charges for extra telephones and long-distance charges (variable) (Needles, Anderson, and Caldwell 1984). Step-fixed costs relates to the concept of volume to the fixed cost object. For example, the rent as a fixed cost is correct up to a set volume. If the facility can only support servicing a finite number (full capacity) of patients and the organization wants to see more than the allowable capacity, it must add additional resources and thus increase its fixed costs (Holmes 1996). Holmes (1996) also

points out that all costs are variable over time. A building, although new today, will someday be replaced. For the life of the building the cost is relatively fixed, perhaps with the exception of the inflation placed on property taxes and potential physical plant upgrades. Ultimately, the life of the organization could exceed the life of the building and therefore necessitate a new building and new costs.

Marginal Costs and Opportunity Costs

According to Brown and Howard (1975) marginal costing is one of the most controversial subjects within the sphere of management accounting. To the economist, marginal costs are those which are associated with the addition of one more unit of production (McConnell 1984, Brown and Howard 1975). To the accountant, marginal costs represent a technique with which management can measure the profitability of an undertaking by considering the behavior of costs (Brown and Howard 1975). Marginal cost is calculated by dividing the change in total costs by the change in quantity (McConnell 1984)

An equally important concept is that of opportunity costs. Because resources are limited, choices between competing alternatives must be made. The value of other alternatives which must be foregone or sacrificed to obtain a unit of any given product is called the opportunity cost for that particular good (McConnell 1984, Finkler 1994). Managers must understand the

economic impact of competing alternatives when using cost information for decision making.

Medical Expense and Performance Reporting System

The purpose of the Medical Expense and Performance Reporting System (MEPRS) is to provide a uniform healthcare cost management system for the DoD. The MEPRS also provides detailed, uniform performance indicators, common expense classification by work centers, uniform reporting of personnel utilization data by work centers, and a cost assignment methodology. Additionally, MEPRS defines work centers, applies performance measures, assigns costs, and gives standardized reports(DoD 6010.13-M 1995). MEPRS produces full costs for each work center. Full costs are determined utilizing a traditional step-down methodology (Figure 1 below). These allocations are based on a workload measure. They might be allocated by the number of minutes used, pounds of laundry, number of visits seen, or man hours spent. These are computed as a ratio of the total expense for the cost center.

One can easily identify inherent problems with this system. Watkins (1995) noted the inequity in the MEPRS cost assignment. She explained that an operating room procedure which lasted 60 minutes was twice as expensive as a procedure which lasted 30 minutes. This methodology ignored the fact that the shorter procedure might require more expensive, sophisticated equipment than a longer less costly procedure (Watkins 1995). An acuity

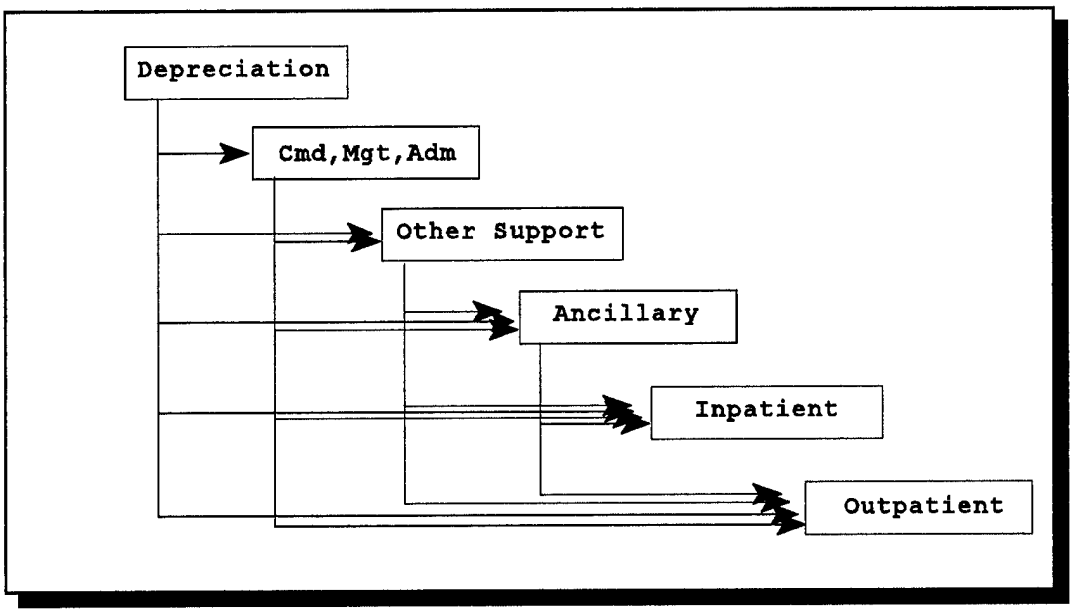

Figure 1. MEPRS cost allocation, a step-down methodology. Source: Holmes, Richard L. 1996. Relevant Cost Decision-Making. *U.S. Army Medical Department Journal*. Feb/Mar, 8-15

adjustment is necessary when using this data for decision-making purposes, regardless of whether using full cost data or looking for relevant costs.

CASE MIX INDICES, PATIENT ACUITY AND DIAGNOSTIC RELATED GROUPS

Under the Prospective Payment System (PPS), Medicare uses six variables to determine the payment for a case (Jencks and Dobson 1987):

1. Urban or Rural location (based on Metropolitan Statistical Area).
2. Labor costs (area wage index)
3. Indirect teaching costs (interns and residents)

4. Disproportionate share (the number of Medicaid or Supplemental Security Income eligibles)

5. The DRG assigned to the patient

6. Outlier Status (supplemental payments for those cases that fall outside the norm)

These variables combine to form hospital billed charges. The billed charges represent a prospective payment for a hospital service regardless of the resources consumed. The Medicare payment is derived from the expected resource consumption, rather than actual consumption. If a hospital can discharge a patient in less time and with less resources than the expected consumption requirements, it will make a profit. The opposite is then true in this regard as well (St. Anthony's 1995).

This study necessitates an understanding of DRGs. The DRG system, designed at Yale University, groups patients by diagnosis (Kasten 1987). Linking similar procedures and their respective complexity produces a relative weight per procedure. This methodology accounts for complications and comorbidity. Furthermore, for cases that lie more than three standard deviations from the norm, an outlier adjustment factor is calculated to account for the increase in resource consumption (St Anthony's 1995). Consider this simple example. A patient presents at a community hospital for human immunodeficiency virus (HIV) with a major related condition. This case would be coded

into DRG 489. DRG 489 has a corresponding arithmetic length of stay (ALOS) of 12.5 days and a relative weight of 1.8158. The hospital's base rate for reimbursement is $4,000. The resultant payment to the hospital for the treatment would be $7,263, irrespective of whether the patient stayed longer or shorter than 12.5 days. That is, $4,000 multiplied by 1.8158 is equal to the hospital payment of $7,263 (St. Anthony's 1995). Thus, the higher the relative weight the greater the payment to the hospital. The relative weight is intended to reflect the resources consumed by the corresponding principal diagnosis.

PURPOSE STATEMENT

The purpose of this graduate management project is to prepare an estimate of the full cost of providing inpatient emergency department services to the military and civilian community of El Paso, Texas for fiscal year 1995. This project will establish a methodology which will allow MTFs to determine an estimated full cost per beneficiary category for emergency medical services. The results of this study may be utilized to conduct negotiations with the local and state government, as well as other non-DoD users, for reimbursement to offset costs associated with the provision of services.

CHAPTER 2

METHOD AND PROCEDURE

The method to assign costs to the various beneficiary categories is problematic. Since no single system in the facility can provide the desired information, the researcher must develop an acceptable procedure to determine full costs. The full cost of emergency department care is described in its most basic form in the formula below (Figure 2).

$$\text{Full costs} = \sum \text{Full Patient Category Costs}$$

Figure 2. Basic full cost formula

The calculation of full beneficiary category costs is the end result of determining how many patients, by DRG and category, were admitted from the emergency department for fiscal year 1995. The following steps outline the process of full cost determination for those patients who are admitted into the system via the emergency department.

Step 1: Outline the patient flow

The first step is to identify how patients flow through the facility once they present at the emergency department. By flow charting this process one can better understand where and how the patients are treated. Appendix A shows the possible matriculation through WBAMC to final disposition. The possible work centers or cost centers are locations where the patient is treated and will accumulate costs.

Step 2: Determine Patient Categories

Patients are categorized into like groupings by Army Regulation 40-3 (1985). This regulation additionally prioritizes the beneficiaries with respect to access to care. For the purpose of this study the researcher has categorized patients in the following manner(Figure 3).

Active Duty (AD)
Active Duty Dependent (ADD)
Non-Active Duty (NAD)
Non- Active Duty Dependent (NADD)
Medicare Eligible (age>65)
Medicaid Eligible
Indigent Care
Veterans' Affairs Beneficiary
Others

Figure 3. Patient Categories

Step 3: Determine Full Costs for All Inpatient Cost Centers

From a MEPRS Part-One Analysis the total amount spent on all inpatient services can be determined. This full cost is necessary to calculate the allocation of costs to each patient. As discussed in the literature review, for decisions involving program cuts, full costs may not be relevant. However, decisions involving pricing require full cost data.

Step 4: Calculate the Average Cost per Diagnosis Related Group

The calculation of an average cost per DRG is a three-step process. The first step is to develop a relative weighted product (RWP) so that the severity and number of each type of admission is accounted. The Retrospective Case Mix Analysis System (RCMAS) provides the number of cases, by CHAMPUS DRG[2],

$$RWP=\sum(Cases*WT)$$

RWP=Relative weighted product

Cases=The number of cases per DRG

WT=The assigned CHAMPUS weight for each DRG

Figure 4. Relative Weighted Product

[2]CHAMPUS DRG- The weights of CHAMPUS DRGs are reflective of those admissions in the civilian healthcare setting, based on non-availability statements (NASs), and not based on resources consumed within the military health services system (MHSS).

which are necessary to compute the average cost per DRG. The figure above shows the formula to calculate the RWP.

The second step is to calculate a conversion factor. The conversion factor is the average cost per relative weighted unit which is similar to a hospital base rate. The hospital base rate, as reviewed in the literature, is a standard reimbursable charge which is multiplied by each DRG to determine the billed charge for each hospital admission. The conversion factor can be used similarly. It can be multiplied by the DRG's relative weight and will arrive at an average cost per DRG for that admission. Figure 5 below demonstrates the calculation of the conversion factor.

$$CF=\sum Inpatient_{costs}/RWP$$

CF=Conversion Factor

$Inpatient_{costs}$=The Full MEPRS cost of All Inpatient Accounts

RWP=Relative weighted product

Figure 5. Calculation of the Conversion Factor

The final step in calculating the average cost per DRG is applying the conversion factor to each individual DRG weight. For example, if the researcher determines a conversion factor equal to $1,000 and wants to calculate the cost of DRG 489 (HIV); simply multiply the $1,000 by the DRG's relative weight of

2.7957. This yields a cost to the hospital of $2,796 based on an average length of stay. Figure 6 shows how to determine the cost per DRG. Figure 7 gives the researcher a mathmatical formula to check the methodology.

$$AVG_{cost}=CF*WT$$

AVG_{cost}=Average cost per DRG

CF=Conversion Factor

WT= The assigned HCFA weight for each DRG

Figure 6: Average Cost per DRG

METHOD CHECK

$$Inpatient_{costs}=\sum(AVG_{cost}*Cases)$$

$Inpatient_{costs}$=The Full MEPRS cost of All Inpatient Accounts

AVG_{cost}=Average cost per DRG

Cases=Number of cases per DRG

Figure 7: Methodology Check

The methodology check should produce an answer equal to the total inpatient costs which were given by the MEPRS part-one analysis. The results of the method is the redistribution of

costs based on the acuity of the patients.

Step 5: Calculation of Emergency Room Costs by Patient Category and DRG

Since the cost of each individual DRG has already been calculated, the researcher only needs to determine those ED admissions by patient category. The Patient Administration System and Biostatistical Activity (PASBA) will categorize the facility's admissions. It will determine the number of patients, by category and DRG, admitted from the ED. Once this information is captured, each beneficiary category's costs may be calculated using the following formula (Figure 7).

$$\text{Category}_{costs}=\sum(\text{Cases}*\text{AVG}_{cost})$$

Category_{costs}=The Total Cost of Each Patient Category, Admitted through ED

Cases=Number of cases per DRG

AVG_{cost}=Average cost per DRG

Figure 7. Total Cost of Each Patient Category-through ED

Validity and Reliability

The value of any research product is limited to the quality of the data collected and the methodology employed. This study required no original data collection. A detailed cost analysis with the generation of new data would yield a significantly more accurate product, however, the time to conduct such a project

would be prohibitive.

All data was acquired through existing sources. Each data source can have questionable or suspect values. The researcher did find all data sources to be reliable. The repeatability of the data generation is not in question. However, the validity could be suspect. The researcher extracted data from the Retrospective Case Mix Analysis System (RCMAS), the Standard Inpatient Data Record (SIDR), and the Medical Expense Performance and Reporting System (MEPRS).

Validity of the Data Systems

The questionability of the MEPRS data lies in understanding how the data is compiled and entered into the system. For example, the allocation of labor costs is driven through the Uniform Chart of Accounts Performance Expense Reporting System (UCAPERS). This system, similar to a time card system, feeds labor allocation information to the MEPRS database. Each physician, nurse, and administrator reports the number of hours worked and location of the work performed. Costs can be mis-allocated if the UCAPERS data is not properly reported to the data entry clerks. For example, if a pediatrician provides inpatient care or on-call duty and does not properly report it to the clerks, a standard entry of forty clinic hours is reported. This ultimately will reduce the reported cost of care provided to inpatients. This is because all of the pediatrician's labor will

count only as outpatient clinic time.

The Patient Administration System and Biostatistical Activity (PASBA) compiles the admissions and dispositions from each medical treatment facility within the Medical Command (MEDCOM). The PASBA2 software system extracts the information from the composite healthcare computer system (CHCS) to develop the Standard Inpatient Data Record (SIDR). Simultaneously, Vector Research Corporation analyzes the SIDR to exclude those items which do not accurately reflect true admissions and dispositions. Removed from the database are incomplete records, those coded "Carded Record Only"[3] and "Absent Sick"[4] (Frazier 1997).

Faults in the PASBA system are readily apparent. Civilian institutions must accurately code each diagnosis in order to receive proper reimbursement for the admission. While military treatment facilities do bill third party payors, the billing to these revenue sources has historically not been seen necessary for the survival of the organization. The lack of financial motivation for accurate coding of inpatient records leaves the system open for suspicion.

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[3]Carded Record Only- Used for those procedures which are not a patient admission but must be recorded; such as an autopsy.

[4]Absent Sick- Used to classify active duty military who are admitted to a civilian facility. This accounts for the expenditure of supplemental funds.

CHAPTER 3

RESULTS

The application of the presented methodology yielded to the researcher the expected outcome. The research revealed that there were 13,027 (RCMAS) admissions to WBAMC in 1995, of which, 2,998 (SIDR) originated from the emergency department (ED). Correspondingly, the full costs of all admissions totaled $63,884,196 (MEPRS). Research also indicated ED admissions generated $18,510,557, or approximately 29% of all inpatient costs.

Table 1 (below) reveals the break-out of the ED costs by patient category. The table shows each category inclusive of those beneficiaries over 65 years of age. For instance, an individual who is an Active Duty Dependent (ADD) and over 65 years old could be double counted as an ADD and also as a Medicare eligible. Because the Medicare eligibles are rolled-up into each category, the table does not give an accurate cost of Medicare patients admitted through the ED but does demonstrate how much of the resources are being consumed by each patient category.

Patient Category	Total Costs	AVG Cost
Active Duty	$1,932,665	$4,423
AD Dependent	$1,924,002	$3,825
Non-Active Duty	$5,971,022	$7,482
NAD Dependent	$3,656,719	$5,841
Veterans	$2,655,696	$7,397
Indigent	$1,800,955	$8,700
MEDICARE	$289,934	$15,260
Others	$279,565	$5,705
Total Costs	$18,510,557	

Table 1: Patient Costs; Including Medicare in each Category

However, in Table 2, those individuals over 65 years of age are removed from each patient category, reflecting only those patients for whom Medicare could not be billed. Thus, those over 65 years of age are calculated as Medicare eligible and would fall strictly in the Medicare patient category. The costs of Medicare eligible patients in this table also include the $289,934 which was reflected in Table 1, Medicare Category.

Patient Category	Total Costs	AVG Cost
Active Duty	$1,928,338	$4,423
AD Dependent	$1,855,044	$3,778
Non-Active Duty	$2,993,515	$7,695
NAD Dependent	$1,964,574	$5,550

Veterans	$1,587,405	$6,902
Indigent	$1,725,893	$8,806
MEDICARE	$6,186,130	$7,226
Others	$269,658	$5,737
Total Costs	$18,510,557	

Table 2: Patient Costs; Excluding Medicare in each Category

CHAPTER 4

DISCUSSION

This methodology provides the researcher with a macro-cost accounting technique to easily identify cost drivers within any military medical treatment facility.

A typical admission from the ED might occur in the following manner: An elderly patient who has fallen at home is brought to the ED by their spouse. The ED physician evaluates the patient and determines the need for a surgical consult. The "Surgeon of the Day" examines the patient, identifies the need for hip surgery and admits him or her. This admission is then counted as a "Surgical Clinic" admission, despite the origin of the admission. MEPRS is designed to allocate these costs to the admitting physician's clinic. While it is important to determine these clinic costs and hold department chiefs responsible for the allocation of scarce resources, it is equally important to understand the resource consumption patterns of the patients. With the push to health promotion and prevention, the ED appears to be a likely candidate for monitoring the effectiveness of DoD and MTF health promotion programs.

DEVELOPMENT OF THE MODEL

A RCMAS report was completed to identify all admissions for FY 1995. The data, which consisted of the DRG code, average length of stay, and the number of cases for each DRG code, were imported into an MICROSOFT EXCEL® spreadsheet. The CHAMPUS relative weighted product (RWP), also known as a DRG weight, was manually typed into the spreadsheet next to the corresponding DRG code (APPENDIX B, Table 3).

Initially the researcher attempted to use the Medicare DRGs produced by the Health Care Financing Administration (HCFA). However, the RCMAS analysts were unable to pull the data in the HCFA format. On the other hand, the PASBA2 clerks were able to produce data in both HCFA and CHAMPUS formats. Interestingly, the RCMAS and PASBA2 systems stem from the same database origin (CHCS) and probably should have produced similar outputs. The limitation of the WBAMC systems necessitated the use of the CHAMPUS weights, rather than the use of the HCFA weights. The spreadsheet sample in Appendix B, Table 3, shows the first fifteen DRGs, the last two DRGs, total admissions, total inpatient costs, and the corresponding calculations for all inpatient admissions for FY 1995.

Once the cost for each admission by DRG was estimated for FY 1995, the next step was to correctly identify which DRGs were admitted from the ED. The PASBA2 system easily allowed queries of the SIDR as to the patient category, admission location (ED),

DRG code, number of cases, and the average length of stay.

Currently, the DoD does not bill Medicare. Since Medicare is not a revenue source there is limited classification of these type patients. There were only nineteen admissions actually classified as Medicare or other Federal beneficiaries for FY 1995. Therefore it was necessary to remove those patients over 65 years of age from each patient category to determine an estimated cost for this group. To alleviate any confusion as to how the patients were classified, Appendix C shows each patient category by PASBA2 codes.

Additionally, it was noted that Medicaid patients were not being coded as such during FY 1995, although they did have a PASBA2 assignment code. In 1995 and previous years, WBAMC would submit a bill to the Defense Finance and Accounting System (DFAS) for those patients who were non-eligible for DoD care and for whom payment for services rendered was not received. DFAS would then reimburse WBAMC with DoD funds. DoD would then try to collect on those outstanding debts (Vega 1996). Like the Medicare coding situation, there was no incentive to classify patients as Medicaid eligible. The Indigent patient category included all Medicaid eligible patients. Therefore, the Medicaid patient category was removed as a distinct patient category. Indigent patients should be classified as those patients without insurance, whether Medicaid, Medicare, or private health insurance, or lacking the ability to pay with private funds.

This definition will be applied in the future to WBAMC patients. As of fiscal year 1997, WBAMC will have the legal authority to directly bill Medicaid for services rendered to Medicaid eligible beneficiaries (Vega 1996).

After identifying the above difficulties, the researcher manually entered the number of admissions for each DRG and patient category. Appendix B (Tables 4-11) shows a sample of each patient category, adjusted for Medicare eligible (over 65 years old) patients. The summation of each patient category represents the total costs generated by the ED in FY 1995.

ANALYSIS AND INTERPRETATION

Overall, WBAMC spent approximately $18.5 million on admissions through the ED in fiscal year 1995. The ED produced 2,998 of the 12,027 inpatient admissions during the year, accounting for approximately 25% of all inpatient workload. However, the ED was responsible for 29% of all inpatient costs for the year. These numbers substantiate the researcher's belief that ED patients are generally more sick and may consume more resources than most who enter the facility through other portals. The chart below shows how the $18 million dollars of ED generated costs were produced by the corresponding patient categories. The red bar indicates the dollar amount expended on that patient category with the inclusion of all Medicare eligible patients. The blue bar represents the dollar amount of each patient

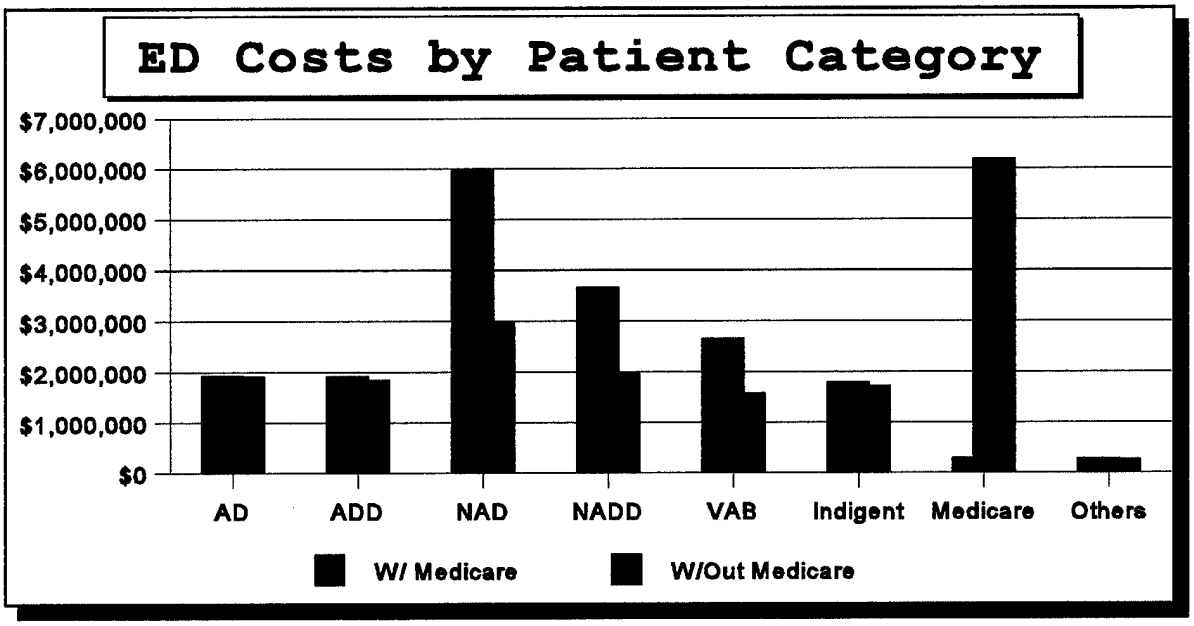

Chart 1: Break-out of Patient Category Costs

category with the Medicare eligibles removed. The difference between the two bars would equate to the amount of resources consumed by Medicare eligible patients. The patient category "Medicare eligible" (sum of all Medicare eligibles) combined to account for the largest expenditure of funds by patient category. However, the primary cost driver of ED costs is the non-active duty patient (NAD) category. As a population, they consumed over $5.9 million dollars in healthcare, by far the greatest amount of any patient category. They had 798 admissions for the year, with an average cost of $7,482. While they were the greatest consumer of resources, they did not have the highest average cost per

admission.

From Table 1 it would appear that Medicare patients were much more acute than the other categories. Medicare yielded an average cost per admission of $15,260. This was an inaccurate picture of Medicare costs because it was only averaged over nineteen patients. When the Medicare category was adjusted to include all 856 admissions, the average cost per admission dropped to $7,231 each. Overall, the Indigent patients were a much more expensive admission. Each admission averaged $8,700 before the removal of the Medicare patients and each admission actually increased to $8,806 per admission after the Medicare eligible patients were removed.

LIMITATIONS

This study applies costs to DRGs based on the acuity levels as determined by the CHAMPUS relative weighted units. It does not account for variation in the length of stay.

To better understand this variation, consider two patients with equal diagnosis and hence equal DRG assignments. Both patients are admitted for a Craniotomy (CHAMPUS DRG 001). Under the current methodology both patients would be allocated a cost of $19,475. This disregards the possibility that one patient stays only six days, while the other stays eight days. Although both of the procedures performed are similar, the patient who stays for the extra two days would not cost anymore, under this methodology, than the other patient. Inherently, this is false.

The patient who stays longer, with a similar procedure performed, would be expected to consume more resources than the shorter stay patient.

The methodology presented calculates the average cost of a DRG, rather than adjusting it for length of stay. It must also be noted that the variation in the allocation of the costs is not linear but rather curvilinear. For example, DRG 001 on the chart below has an average length of stay of 13.5 days. If the patient

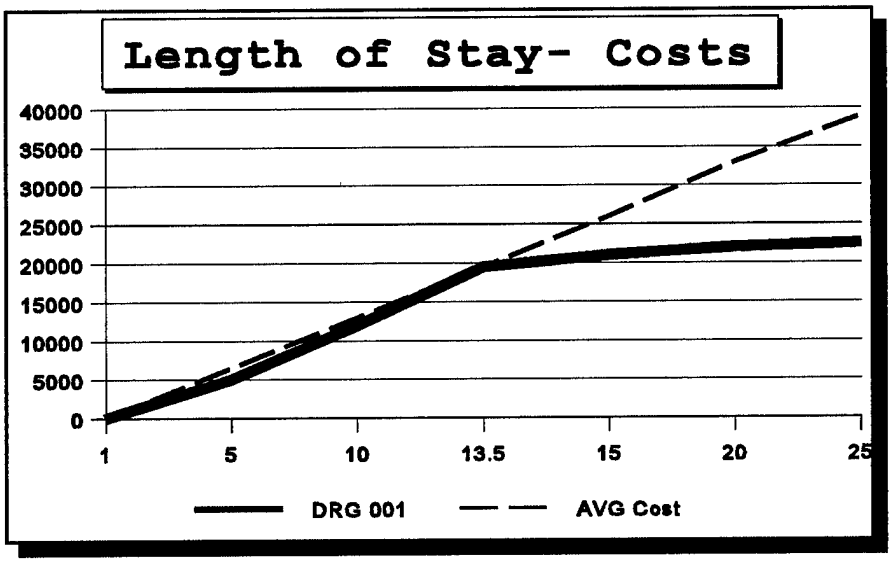

Chart 2: Length of Stay and Cost Allocation

was discharged on day 7, before the average of 13.5 days, the resources consumed would be significantly less than someone who was admitted exactly on the average. Conversely, if the patient stays longer, there would be more resources consumed. Upon reaching day 14, there would only be incremental increases in

costs attributable to the patient staying longer. The leveling off of DRG 001 beyond day 14 represents the decreasing cost of caring for a patient once the primary admission diagnosis is treated. The continued increase of the average cost represents the limitation of this methodology, as it does not adjust for the variation in the length of stay.

Furthermore, this study does not include the outpatient visit cost of an ED admission. Prior to any admission from the ED, an exam is conducted. A routinely scheduled admission from a clinic would include a series of outpatient appointments prior to the day of admission. The ED operates in a similar manner, except the outpatient visit can occur within hours, minutes, or simultaneously with the admission. Although cost of an ED outpatient visit is easily obtained from MEPRS ($140 per visit), the cost per visit is not adjusted for patient acuity and would provide cost information of minimal value. Significantly more research would be necessary to accurately allocate the cost of an outpatient visit prior to an admission.

CHAPTER 5

RECOMMENDATIONS

This study was designed to yield full cost information on all admissions for fiscal year 1995 from the emergency department. The full cost data allows management the opportunity to determine where the cost drivers are within their facility. The costs produced by this study must only be used for pricing decisions. The non-active duty and non-active duty dependents are the most likely individuals to have third party insurance. They provide a unique opportunity for a revenue source. As of this fiscal year, the Medicaid beneficiaries will be removed from the Indigent patient category. The remaining indigent individuals will, for the time being, be paid for by passing the bill to (DFAS). DFAS is expected to cease payment for these services which are considered the responsibility of local government (Williams 1997). WBAMC should view the local governing body as a revenue source for all indigent patients. This study could assist in the justification of such an endeavor.

This study has created the opportunity for continued research in this area of study. The extension of this project by applying an adjustment factor for variation in the average length of stay would yield more accurate results. Another continuation

of this study would be an investigation of the relationship of the outcomes of this methodology as compared to the interagency rates. An analysis of the variances between the researcher's identified costs per DRG and the DoD Interagency rates would assist in determining the efficiencies of providing health care services. For example, DRG 001 has been identified as costing WBAMC $19,475 per admission. The interagency rate shows a corresponding price of $20,647. Theoretically, WBAMC should have lower costs than the interagency rate in all DRGs. Further study could determine if WBAMC's resources are being wisely allocated. Furthermore, a slight modification of this methodology could produce a relevant cost (Holmes 1996) decision-making tool.

The costs of adding an additional product line could be determined by identifying those relevant costs which vary with the decision. The sum of those costs could replace the "$Inpatient_{costs}$=The Full MEPRS cost of All Inpatient Accounts" portion of the formula to produce a relevant cost decision. Initially the researcher would identify and apply the relevant costs and with the current methodology produce a relevant cost per DRG. The identification of product line specific DRGs would illustrate how much it would cost to produce those DRGs. This of course does not account for the possible addition of more resources to produce more volume within the product line. But some modifications would again simplify the process of applying costs to product line "make-buy" decisions.

Lastly, it is recommended that further study be initiated to determine each patient categories' most frequent and most costly DRGs. This will allow for the development of utilization management initiatives which, in time, could possibly save scarce resources and have a positive effect on the fiscal outcomes of the medical center.

CHAPTER 6

CONCLUSIONS

The purpose of this graduate management project was to prepare an estimate of the full cost of providing inpatient care to emergency department admissions for the military and civilian community of El Paso, Texas for fiscal year 1995. It was found to be an efficient, reliable methodology which can be applied to any military treatment facility. By understanding how costs are accumulated within the MTF, management may make more informed decisions as to the provision of health services. This methodology combines a product line costing approach with the current step down process of MEPRS. The end result places a price tag on the product line in question.

This study illustrates, with relative accuracy, which patients, by category, are driving costs within the ED. It shows that the emergency department generates costs beyond those outpatient visits, determined and reported by MEPRS. Almost 30% of all inpatient costs can be traced to one portal of entry and that portal should be properly monitored to enhance correct utilization of limited resources.

If local communities wish to continue receiving care within DoD MTFs, they must be expected to reimburse the cost of that

care. William Beaumont Army Medical Center provides significant resources to the community of El Paso. Administrators must pursue revenue streams whenever and wherever they appear. The survival of any organization, whether military or civilian, lies in the ability to manage limited resources. At a recent healthcare seminar, the speaker stated, "When competition is tight, quality is assumed, and the differentiating factor is cost" (Hernandez 1997). William Beaumont Army Medical Center must continue to pursue and refine its cost accounting techniques to determine which product lines need refinement, thereby remaining solvent in an increasingly complex health care arena.

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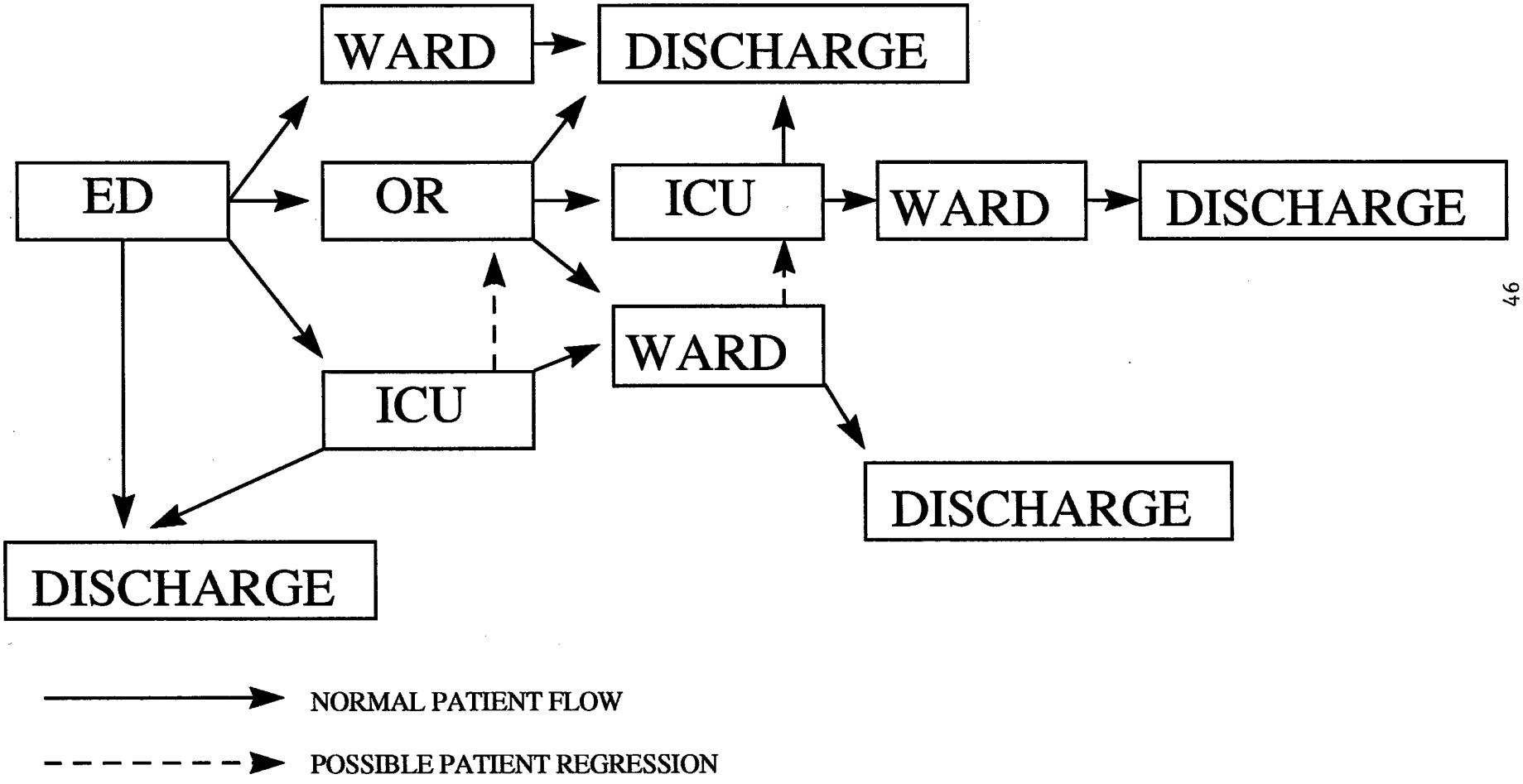
APPENDIX A

FLOW CHART OF ED PATIENTS



APPENDIX B
TABLE 3

SAMPLE: INPATIENT DRG COST CALCULATION

DRG	DRG Name	Admits	ALOS	Weight	RWP	AVG COST	TOTAL COST
1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	13	14.69	3.7743	49.0659	$ 19,475	$ 253,180
2	CRANIOTOMY FOR TRAUMA AGE >17	6	6.83	3.6925	22.155	$ 19,053	$ 114,320
3	CRANIOTOMY AGE 0-17	9	7.78	3.0187	27.1683	$ 15,577	$ 140,189
4	SPINAL PROCEDURES	5	11.00	2.2502	11.251	$ 11,611	$ 58,055
5	EXTRACRANIAL VASCULAR PROCEDURES	28	4.46	1.6238	45.4664	$ 8,379	$ 234,607
6	CARPAL TUNNEL RELEASE	19	1.00	0.7419	14.0961	$ 3,828	$ 72,736
7	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W CC	10	8.40	2.5566	25.566	$ 13,192	$ 131,921
8	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W/O CC	24	2.00	1.1430	27.432	$ 5,898	$ 141,549
9	SPINAL DISORDERS & INJURIES	6	21.33	1.8664	11.1984	$ 9,631	$ 57,784
10	NERVOUS SYSTEM NEOPLASMS W CC	7	17.71	1.2976	9.0832	$ 6,696	$ 46,869
12	DEGENERATIVE NERVOUS SYSTEM DISORDERS	18	5.11	1.4476	26.0568	$ 7,470	$ 134,453
13	MULTIPLE SCLEROSIS & CEREBELLAR ATAXIA	1	1.00	0.8844	0.8844	$ 4,564	$ 4,564
14	SPECIFIC CEREBROVASCULAR DISORDERS EXCEPT TIA	64	7.05	1.3875	88.8	$ 7,160	$ 458,208
15	TRANSIENT ISCHEMIC ATTACKS AND PRECEREBRAL OCCLUSIONS	56	3.63	0.8050	45.08	$ 4,154	$ 232,613
-	-	-	-	-	-	-	-
900	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE <=21 W/O	16	10.44	0.9536	15.2576	$ 4,921	$ 78,729
901	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE > 21 W/O	63	7.46	0.5756	36.2628	$ 2,970	$ 187,116
	TOTAL VISITS AND TOTAL COSTS	**13027**			12380.65		**$ 63,884,196**

APPENDIX B
TABLE 4

SAMPLE: COST CALCULALTION OF ACTIVE DUTY ADMISSIONS FROM ED

DRG	DRG Name	Admits	ALOS	AVG Cost	Total Costs
1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	2	14.69	$ 19,475	$ 38,951
2	CRANIOTOMY FOR TRAUMA AGE >17	0	6.83	$ 19,053	$ -
3	CRANIOTOMY AGE 0-17	0	7.78	$ 15,577	$ -
4	SPINAL PROCEDURES	1	11.00	$ 11,611	$ 11,611
5	EXTRACRANIAL VASCULAR PROCEDURES	0	4.46	$ 8,379	$ -
6	CARPAL TUNNEL RELEASE	0	1.00	$ 3,828	$ -
7	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W CC	1	8.40	$ 13,192	$ 13,192
8	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W/O CC	1	2.00	$ 5,898	$ 5,898
9	SPINAL DISORDERS & INJURIES	4	21.33	$ 9,631	$ 38,523
10	NERVOUS SYSTEM NEOPLASMS W CC	0	17.71	$ 6,696	$ -
12	DEGENERATIVE NERVOUS SYSTEM DISORDERS	0	5.11	$ 7,470	$ -
13	MULTIPLE SCLEROSIS & CEREBELLAR ATAXIA	0	1.00	$ 4,564	$ -
14	SPECIFIC CEREBROVASCULAR DISORDERS EXCEPT TIA	0	7.05	$ 7,160	$ -
15	TRANSIENT ISCHEMIC ATTACKS AND PRECEREBRAL OCCLUSIONS	0	3.63	$ 4,154	$ -
-	-	-	-	-	-
900	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE <=21 W/O	6	10.44	$ 4,921	$ 29,523
901	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE > 21 W/O	11	7.46	$ 2,970	$ 32,671
	TOTAL VISITS AND TOTAL COSTS	**436**			**$ 1,928,338**

Note: Medicare Eligible Beneficiaries were removed from this category and accounted for in Appendix B, Table 10: "Medicare Eligible."

APPENDIX B
TABLE 5

SAMPLE: COST CALCULATION OF ACTIVE DUTY DEPENDENT ADMISSIONS FROM ED

DRG	DRG Name	Admits	ALOS	AVG Cost	Total Costs
1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	0	14.69	$ 19,475	$ -
2	CRANIOTOMY FOR TRAUMA AGE >17	0	6.83	$ 19,053	$ -
3	CRANIOTOMY AGE 0-17	1	7.78	$ 15,577	$ 15,577
4	SPINAL PROCEDURES	0	11	$ 11,611	$ -
5	EXTRACRANIAL VASCULAR PROCEDURES	0	4.46	$ 8,379	$ -
6	CARPAL TUNNEL RELEASE	0	1	$ 3,828	$ -
7	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W CC	0	8.4	$ 13,192	$ -
8	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W/O CC	0	2	$ 5,898	$ -
9	SPINAL DISORDERS & INJURIES	0	21.33	$ 9,631	$ -
10	NERVOUS SYSTEM NEOPLASMS W CC	0	17.71	$ 6,696	$ -
12	DEGENERATIVE NERVOUS SYSTEM DISORDERS	0	5.11	$ 7,470	$ -
13	MULTIPLE SCLEROSIS & CEREBELLAR ATAXIA	0	1	$ 4,564	$ -
14	SPECIFIC CEREBROVASCULAR DISORDERS EXCEPT TIA	1	7.05	$ 7,160	$ 7,160
15	TRANSIENT ISCHEMIC ATTACKS AND PRECEREBRAL OCCLUSIONS	0	3.63	$ 4,154	$ -
-	-	-	-	-	-
900	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE <=21 W/O	2	10.44	$ 4,921	$ 9,841
901	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE > 21 W/O	5	7.46	$ 2,970	$ 14,850
	TOTAL VISITS AND TOTAL COSTS	**491**			**$1,855,044**

Note: Medicare Eligible Beneficiaries were removed from this category and accounted for in Appendix B, Table 10: "Medicare Eligible."

APPENDIX B
TABLE 6

SAMPLE: COST CALCULATION OF NON-ACTIVE DUTY ADMISSIONS FROM ED

DRG	DRG Name	Admits	ALOS	AVG Cost	Total Costs
1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	0	14.69	$ 19,475	$ -
2	CRANIOTOMY FOR TRAUMA AGE >17	1	6.83	$ 19,053	$ 19,053
3	CRANIOTOMY AGE 0-17	0	7.78	$ 15,577	$ -
4	SPINAL PROCEDURES	0	11	$ 11,611	$ -
5	EXTRACRANIAL VASCULAR PROCEDURES	1	4.46	$ 8,379	$ 8,379
6	CARPAL TUNNEL RELEASE	0	1	$ 3,828	$ -
7	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W CC	0	8.4	$ 13,192	$ -
8	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W/O CC	0	2	$ 5,898	$ -
9	SPINAL DISORDERS & INJURIES	0	21.33	$ 9,631	$ -
10	NERVOUS SYSTEM NEOPLASMS W CC	0	17.71	$ 6,696	$ -
12	DEGENERATIVE NERVOUS SYSTEM DISORDERS	1	5.11	$ 7,470	$ 7,470
13	MULTIPLE SCLEROSIS & CEREBELLAR ATAXIA	0	1	$ 4,564	$ -
14	SPECIFIC CEREBROVASCULAR DISORDERS EXCEPT TIA	6	7.05	$ 7,160	$ 42,957
15	TRANSIENT ISCHEMIC ATTACKS AND PRECEREBRAL OCCLUSIONS	5	3.63	$ 4,154	$ 20,769
-	-	-	-	-	-
900	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE <=21 W/O	0	10.44	$ 4,921	$ -
901	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE > 21 W/O	6	7.46	$ 2,970	$ 17,821
	TOTAL VISITS AND TOTAL COSTS	**389**			**$ 2,993,515**

Note: Medicare Eligible Beneficiaries were removed from this category and accounted for in Appendix B, Table 10: "Medicare Eligible."

APPENDIX B
TABLE 7

SAMPLE: COST CALCULATION OF NON-ACTIVE DUTY DEPENDENT ADMISSIONS FROM ED

DRG	DRG Name	Admits	ALOS	AVG Cost	Total Costs
1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	0	14.69	$ 19,475	$ -
2	CRANIOTOMY FOR TRAUMA AGE >17	0	6.83	$ 19,053	$ -
3	CRANIOTOMY AGE 0-17	0	7.78	$ 15,577	$ -
4	SPINAL PROCEDURES	0	11	$ 11,611	$ -
5	EXTRACRANIAL VASCULAR PROCEDURES	0	4.46	$ 8,379	$ -
6	CARPAL TUNNEL RELEASE	0	1	$ 3,828	$ -
7	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W CC	0	8.4	$ 13,192	$ -
8	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W/O CC	0	2	$ 5,898	$ -
9	SPINAL DISORDERS & INJURIES	0	21.33	$ 9,631	$ -
10	NERVOUS SYSTEM NEOPLASMS W CC	0	17.71	$ 6,696	$ -
12	DEGENERATIVE NERVOUS SYSTEM DISORDERS	0	5.11	$ 7,470	$ -
13	MULTIPLE SCLEROSIS & CEREBELLAR ATAXIA	0	1	$ 4,564	$ -
14	SPECIFIC CEREBROVASCULAR DISORDERS EXCEPT TIA	3	7.05	$ 7,160	$ 21,479
15	TRANSIENT ISCHEMIC ATTACKS AND PRECEREBRAL OCCLUSIONS	3	3.63	$ 4,154	$ 12,461
-	-	-	-	-	-
900	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE <=21 W/O	0	10.44	$ 4,921	$ -
901	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE > 21 W/O	3	7.46	$ 2,970	$ 8,910
	TOTAL VISITS AND TOTAL COSTS	**354**			**$ 1,964,574**

Note: Medicare Eligible Beneficiaries were removed from this category and accounted for in Appendix B, Table 10: "Medicare Eligible."

APPENDIX B
TABLE 8

SAMPLE: COST CALCULATION OF VETERAN'S AFFAIRS ADMISSIONS FROM ED

DRG	DRG Name	Admits	ALOS	AVG Cost	Total Costs
1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	0	14.69	$ 19,475	$ -
2	CRANIOTOMY FOR TRAUMA AGE >17	0	6.83	$ 19,053	$ -
3	CRANIOTOMY AGE 0-17	0	7.78	$ 15,577	$ -
4	SPINAL PROCEDURES	0	11	$ 11,611	$ -
5	EXTRACRANIAL VASCULAR PROCEDURES	0	4.46	$ 8,379	$ -
6	CARPAL TUNNEL RELEASE	0	1	$ 3,828	$ -
7	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W CC	0	8.4	$ 13,192	$ -
8	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W/O CC	0	2	$ 5,898	$ -
9	SPINAL DISORDERS & INJURIES	0	21.33	$ 9,631	$ -
10	NERVOUS SYSTEM NEOPLASMS W CC	0	17.71	$ 6,696	$ -
12	DEGENERATIVE NERVOUS SYSTEM DISORDERS	0	5.11	$ 7,470	$ -
13	MULTIPLE SCLEROSIS & CEREBELLAR ATAXIA	0	1	$ 4,564	$ -
14	SPECIFIC CEREBROVASCULAR DISORDERS EXCEPT TIA	2	7.05	$ 7,160	$ 14,319
15	TRANSIENT ISCHEMIC ATTACKS AND PRECEREBRAL OCCLUSIONS	0	3.63	$ 4,154	$ -
-	-	-	-	-	-
900	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE <=21 W/O	0	10.44	$ 4,921	$ -
901	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE > 21 W/O	14	7.46	$ 2,970	$ 41,581
	TOTAL VISITS AND TOTAL COSTS	**230**			**$1,587,405**

Note: Medicare Eligible Beneficiaries were removed from this category and accounted for in Appendix B, Table 10: "Medicare Eligible."

APPENDIX B
TABLE 9

SAMPLE: COST CALCULATION OF INDIGENT PATIENT ADMISSIONS FROM ED

DRG	DRG Name	Admits	ALOS	AVG Cost	Total Costs
1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	1	14.69	$ 19,475	$ 19,475
2	CRANIOTOMY FOR TRAUMA AGE >17	1	6.83	$ 19,053	$ 19,053
3	CRANIOTOMY AGE 0-17	1	7.78	$ 15,577	$ 15,577
4	SPINAL PROCEDURES	1	11	$ 11,611	$ 11,611
5	EXTRACRANIAL VASCULAR PROCEDURES	0	4.46	$ 8,379	$ -
6	CARPAL TUNNEL RELEASE	0	1	$ 3,828	$ -
7	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W CC	0	8.4	$ 13,192	$ -
8	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W/O CC	0	2	$ 5,898	$ -
9	SPINAL DISORDERS & INJURIES	0	21.33	$ 9,631	$ -
10	NERVOUS SYSTEM NEOPLASMS W CC	0	17.71	$ 6,696	$ -
12	DEGENERATIVE NERVOUS SYSTEM DISORDERS	0	5.11	$ 7,470	$ -
13	MULTIPLE SCLEROSIS & CEREBELLAR ATAXIA	0	1	$ 4,564	$ -
14	SPECIFIC CEREBROVASCULAR DISORDERS EXCEPT TIA	0	7.05	$ 7,160	$ -
15	TRANSIENT ISCHEMIC ATTACKS AND PRECEREBRAL OCCLUSIONS	0	3.63	$ 4,154	$ -
-	-	-	-	-	-
900	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE <=21 W/O	0	10.44	$ 4,921	$ -
901	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE > 21 W/O	0	7.46	$ 2,970	$ -
	TOTAL VISITS AND TOTAL COSTS	**196**			**$ 1,725,893**

Note: Medicare Eligible Beneficiaries were removed from this category and accounted for in Appendix B, Table 10: "Medicare Eligible."

APPENDIX B
TABLE 10

SAMPLE: COST CALCULATION OF MEDICARE ELIGIBLE PATIENT ADMISSIONS FROM ED

DRG	DRG Name	Admits	ALOS	AVG Cost	Total Costs
1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	2	14.69	$ 19,475	$ 38,951
2	CRANIOTOMY FOR TRAUMA AGE >17	2	6.83	$ 19,053	$ 38,107
3	CRANIOTOMY AGE 0-17	0	7.78	$ 15,577	$ -
4	SPINAL PROCEDURES	0	11	$ 11,611	$ -
5	EXTRACRANIAL VASCULAR PROCEDURES	4	4.46	$ 8,379	$ 33,515
6	CARPAL TUNNEL RELEASE	0	1	$ 3,828	$ -
7	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W CC	3	8.4	$ 13,192	$ 39,576
8	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W/O CC	0	2	$ 5,898	$ -
9	SPINAL DISORDERS & INJURIES	0	21.33	$ 9,631	$ -
10	NERVOUS SYSTEM NEOPLASMS W CC	2	17.71	$ 6,696	$ 13,391
12	DEGENERATIVE NERVOUS SYSTEM DISORDERS	1	5.11	$ 7,470	$ 7,470
13	MULTIPLE SCLEROSIS & CEREBELLAR ATAXIA	0	1	$ 4,564	$ -
14	SPECIFIC CEREBROVASCULAR DISORDERS EXCEPT TIA	33	7.05	$ 7,160	$ 236,264
15	TRANSIENT ISCHEMIC ATTACKS AND PRECEREBRAL OCCLUSIONS	11	3.63	$ 4,154	$ 45,692
-	-	-	-	-	-
900	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE <=21 W/O	3	10.44	$ 4,921	$ 14,762
901	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE > 21 W/O	0	7.46	$ 2,970	$ -
	TOTAL VISITS AND TOTAL COSTS	**855**			**$ 6,186,130**

Note: This Table includes all beneficiaries over age 65, regardless of primary patient category.

APPENDIX B
TABLE 11

SAMPLE: COST CALCULATION OF ALL OTHER PATIENT ADMISSIONS FROM ED

DRG	DRG Name	Admits	ALOS	AVG Cost	Total Costs
1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	0	14.69	$ 19,475	$ -
2	CRANIOTOMY FOR TRAUMA AGE >17	0	6.83	$ 19,053	$ -
3	CRANIOTOMY AGE 0-17	0	7.78	$ 15,577	$ -
4	SPINAL PROCEDURES	0	11	$ 11,611	$ -
5	EXTRACRANIAL VASCULAR PROCEDURES	0	4.46	$ 8,379	$ -
6	CARPAL TUNNEL RELEASE	0	1	$ 3,828	$ -
7	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W CC	0	8.4	$ 13,192	$ -
8	PERIPH & CRANIAL NERVE & OTHER NERV SYST PROC W/O CC	0	2	$ 5,898	$ -
9	SPINAL DISORDERS & INJURIES	0	21.33	$ 9,631	$ -
10	NERVOUS SYSTEM NEOPLASMS W CC	0	17.71	$ 6,696	$ -
12	DEGENERATIVE NERVOUS SYSTEM DISORDERS	0	5.11	$ 7,470	$ -
13	MULTIPLE SCLEROSIS & CEREBELLAR ATAXIA	0	1	$ 4,564	$ -
14	SPECIFIC CEREBROVASCULAR DISORDERS EXCEPT TIA	0	7.05	$ 7,160	$ -
15	TRANSIENT ISCHEMIC ATTACKS AND PRECEREBRAL OCCLUSIONS	0	3.63	$ 4,154	$ -
-	-	-	-	-	-
900	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE <=21 W/O	0	10.44	$ 4,921	$ -
901	ALC/DRUG ABUSE OR DEPEND, DETOX OR OTH SYMPT TREAT AGE > 21 W/O	0	7.46	$ 2,970	$ -
	TOTAL VISITS AND TOTAL COSTS	**47**			**$ 269,636**

Note: Medicare Eligible Beneficiaries were removed from this category and accounted for in Appendix B, Table 10: "Medicare Eligible."

APPENDIX C

PASBA2 PATIENT CATEGORY CODES

Active Duty Army	
A11	Active Duty Army
Active Duty Dependent	
A41	Dependent AD, Excluding Former Spouse
F41	Dependent AD, Excluding Former Spouse
N41	Dependent AD, Excluding Former Spouse
Non-Active Duty	
A31	Length of Service- Retiree
A32	Permanent Disabled Retirement List
C31	Length of Service- Retiree
F31	Length of Service- Retiree
F32	Permanent Disabled Retirement List
M31	Length of Service- Retiree
N31	Length of Service- Retiree
Non-Active Duty Dependent	
A43	Dependent-Living Retired, Excluding Former Spouse
A45	Dependent-Deceased AD, Excluding Former Spouse
A47	Dependent-Deceased Retired, Excluding Former Spouse
C43	Dependent-Living Retired, Excluding Former Spouse
C47	Dependent-Deceased Retired, Excluding Former Spouse
F43	Dependent-Living Retired, Excluding Former Spouse
F47	Dependent-Deceased Retired, Excluding Former Spouse
M47	Dependent-Deceased Retired, Excluding Former Spouse
N43	Dependent-Living Retired, Excluding Former Spouse
N45	Dependent-Deceased AD, Excluding Former Spouse
N47	Dependent-Deceased Retired, Excluding Former Spouse
Veteran's Affairs Beneficiary	
K61	Veterans Administration
Indigent	
K92	Civilian Emergencies
Medicare	
K64	Other Federal Agencies
Others	
A48	Unremarried Former Spouses

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The purpose of this graduate management project was to prepare an estimate of the full cost of providing inpatient care for emergency department admissions for the military and civilian community of El Paso, Texas for fiscal year 1995. It was found to be an efficient, reliable methodology which can be applied to any military treatment facility. By understanding how costs are accumulated within the MTF, management may make more informed decisions as to the provision of health services. This methodology combines a product line costing approach with the current step down process of MEPRS. The end result places a price tag on the product line in question.

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